THE DIVISIA MONETARY AGGREGATES, DEMAND FOR MONEY STABILITY, INCOME, AND INFLATION FLUCTUATIONS IN SELECTED SUB-SAHARAN AFRICA

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ABSTRACT

The financial sector reforms adopted in the 4 selected Sub-Saharan Africa (SSA) countries, namely Kenya, Malawi, Nigeria, and South Africa have resulted to a remarkable change in the composition of monetary aggregates making the simple sum measure of money questionable. The reforms affect the stability of money demand function and create uncertainty in the macroeconomic environment leading to a slow growth and high inflation rates. This study constructs a new Divisia monetary aggregates for 4 selected SSA countries and investigate the role of monetary aggregates in the money demand stability, income and price fluctuations. Two variables; monetary uncertainty (MOU) and output uncertainty (OUU) were incorporated into the model. The study employed quarterly time series data covering 2000Q1 to 2015Q3. The ARDL and Toda Yamamoto causality methods were utilized in the analysis. The main objective of the study is to investigate the role of monetary aggregates in monetary policy decisions. The results indicate that Divisia monetary aggregates perform well in explaining the stability of money demand functions. Both MOU and OUU are quite significant in the money demand stability. The study added to the existing literature on money demand by empirically exploring the impact of the MOU and OUU on money demand stability using an alternative monetary aggregate. The results also shows a significant two-way causality between money and income, however, money and prices signifying an endogeneity in money supply. The Divisia monetary aggregates perform relatively well in explaining income and prices fluctuations. The important policy implication of this finding is that monetary targeting could be more appropriate for the 4 selected SSA countries monetary policy decisions and therefore that monetary aggregates can be used to influence the growth in income and to minimize price fluctuations.

Keywords: ARDL, Divisia aggregates, money demand stability, simple sum aggregates, Toda-Yamamoto causality.

ABSTRAK

Pembaharuan sektor kewangan yang diterima pakai di 4 negara Sub-Sahara Afrika (SSA) yang dipilih, iaitu Kenya, Malawi, Nigeria, dan Afrika Selatan telah menghasilkan perubahan yang luar biasa dalam komposisi agregat monetari masih dipersoalkan penjumlahan mudah wang. Pembaharuan menjejaskan kestabilan fungsi permintaan wang dan mewujudkan ketidakpastian dalam persekitaran makroekonomi yang membawa kepada pertumbuhan perlahan dan kadar inflasi yang tinggi. Kajian ini membina agregat kewangan Divisia baru untuk 4 negara SSA terpilih dan menyiasat peranan agregat monetari dalam kestabilan permintaan wang, turun naik pendapatan dan harga. Dua pembolehubah; ketidakpastian kewangan (MOU) dan ketidakpastian pengeluaran (OUU) dimasukkan ke dalam model. Kajian ini menggunakan data siri masa suku tahunan yang meliputi 2000Q1 hingga 2015Q3. Kaedah kausaliti Toda Yamamoto dan ARDL digunakan dalam analisis. Objektif utama kajian ini adalah untuk mengkaji peranan agregat monetari dalam membuat keputusan dasar monetari. Dapatan kajian menunjukkan bahawa agregat monetari Divisia berfungsi dengan baik dalam menjelaskan kestabilan fungsi permintaan wang. Kedua-dua MOU dan OUU menunjukkan kestabilan permintaan wang yang signifikan. Kajian ini menambah kepada kajian sedia ada mengenai permintaan wang secara empirik dalam meneroka impak MOU dan OUU terhadap kestabilan permintaan wang dengan menggunakan alternatif agregat monetari. Selain itu, keputusan ini juga menunjukkan hubungan dua hala yang signifikan di antara wang dan pendapatan, walaubagaimanapun, wang dan harga menunjukkan ada endogeniti dalam bekalan wang. Agregat kewangan Divisia berfungsi dengan baik dalam menjelaskan turun naik pendapatan dan harga. Implikasi dasar yang penting dalam penemuan ini ialah penyasaran kewangan mungkin lebih sesuai untuk keputusan dasar monetari bagi 4 negara-negara SSA yang dipilih, dan agregat monetari itu boleh digunakan untuk mempengaruhi pertumbuhan pendapatan dan untuk meminimumkan turun naik harga.

Kata Kunci: ARDL, agregat Divisia, kestabilan permintaan wang, agregat penjumlahan mudah, Kaedah Toda-Yamamoto.

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LIST OF ABBREVIATIONS

ADF	Augmented Dickey Fuller
AIC	Akaike Information Criterion
ARCH	Auto Regressive Conditional Heteroskedasticity
ARDL	Auto Regressive Distributed Lag
CBN	Central Bank of Nigeria
CBK	Central Bank of Kenya
CBM	Central Bank of Malawi
CE	Currency Equivalent
CES	Constant Elasticity of Substitution
CFS	Centre for Financial Stability
DM	Divisia Money
ECM	Error Correction Model
ECT	Error Correction Term
GARCH	Generalized Autoregressive Conditional Heteroskedasticity
GDP	Gross Domestic Product
IFS	International Financial Statistics
IMF	International Monetary Fund
LM	Langrange Multiplier
PP	Philip-Perron Unit Root Test
SARB	South Africa Reserve Bank
SBC	Schwartz Bayesian Criterion
SM	Simple Sum Money
SSA	Sub Saharan Africa
VAR	Vector Autoregression
VES	Variable Elasticity of Substitution
WDIs	World Development Indicators.

CHAPTER ONE

INTRODUCTION

1.1 Background of the Study

In small open economies such as the Sub -Saharan African (SSA) countries, stability in price signifying a low and stable rate of inflation plays a vital role in maintaining stability for both macroeconomic and financial system (Hossain 2017). Stability in macroeconomic system boast innovations in technology and rises investment output. The productive investment thus remains a key source of a sustainable economic growth (Faria & Carneiro, 2001). The rapid economic advancement realized by the Latin America and Asian coutries shows that stability in macroeconomic is important in developing nations due to the simple reason that the economic, political, and social institutions in the economies are not fully developed to accommodate the severe impact of macroeconomic instability on key factors like; savings, investments, trade and capital flows (Montiel, 2011).

What role can money play in the conduct of monetary policy for price stability, and sustainable economic growth has remained a major policy issue in the Sub-Saharan Africa (SSA) countries. The central banks have options to apply a monetary aggregates-based framework or a short-term interest rate-based framework of monetary polcy to achieve the goal of price stability and economic growth. Which of these frameworks is the best option for developing countries such as the SSA countries is yet an unresolved issue (Hossain, 2017). This is because it depends on numerous factors which among others includes; whether the predominant shocks to the economies are monetary or real or a combination of both (Poole, 1970). Usng the

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REFERENCES

Abdullah, H., Ali, J., & Matahir, H. (2010). Re-examining the demand for money in Asean-5 countries. *Asian Social Science*, *6*(7), 146-155.

Abdullah, D. A., & Rangazas, P. C. (1988). Money and the business cycle: Another look. *The Review of Economics and statistics*, 70(4), 680-685.

Agénor, P. R., McDermott, C. J., & Prasad, E. S. (2000). Macroeconomic fluctuations in developing countries: Some stylized facts. *The World Bank Economic Review, 14*(2), 251-285.

Akinlo, A. E. (2006). The stability of money demand in Nigeria: An autoregressive distributed lag approach. *Journal of Policy Modeling*, *28*(4), 445-452.

Al-Fawwaz, T. M., & Al-Sawai'e, K. M. (2012). Output, money, and prices: The case of Jordan. *International Business Research*, *5*(12), 223-229.

Al-Jarrah, Mohammad (1996). Money, income, and prices in Saudi Arabia: A cointegration and causality analysis. *Pakistan Economic and Social Review*, 34(1), 41-53.

Alkhareif, R. M., & Barnett, W. A. (2012). Divisia monetary aggregates for the GCC countries. In *Recent Developments in Alternative Finance: Empirical Assessments and Economic Implications.* 22, 1-37. Emerald Group Publishing Limited.

Anderson, R. G., & Jones, B. (2011). A comprehensive revision of the US monetary services (Divisia) indexes. *Federal Reserve Bank of St. Louis Review.* 93(5), 325-359.

Anderson, R. G., Jones, B., & Nesmith, T. (1997). Monetary aggregation theory and statistical index numbers. *Federal Reserve Bank of St. Louis Review*. 79(5), 31-51.

Anderson, R. G., Chauvet, M., & Jones, B. (2015). Nonlinear relationship between permanent and transitory components of monetary aggregates and the economy. *Econometric Reviews*, 34(1-2), 228-254.

Anderson, R. G., & Kavajecz, K. A. (1994). A historical perspective on the Federal Reserve's monetary aggregates: Definition, construction and targeting. *Review-Federal Reserve Bank of Saint Loius*, *76*, 1-31.

Anowor, O. F., & Okorie, G. C. (2016). A Reassessment of the impact of monetary policy on economic growth: Study of Nigeria. *International Journal of Developing and Emerging Economies*, *4*(1), 82-90.

Arango, S., & Nadiri, M. I. (1981). Demand for money in open economies. *Journal of Monetary Economics*, 7(1), 69-83.

Arize, A. C. (1994). A re-examination of the demand for money in small developing economies. *Applied Economics*, *26*(3), 217-228.

Arize, A. C., & Nam, K. (2012). The demand for money in Asia: Some further evidence. *International Journal of Economics and Finance,* 4(8), 59-74.

Arize, A. C., Malindretos, J., & Grivoyannis, E. C. (2005). Inflation-rate volatility and money demand: Evidence from less developed countries. *International Review of Economics & Finance*, *14*(1), 57-80.

Asteriou, D., & Hall, S. G. (2007). *Applied Econometrics: A modern approach*, revised edition. Hampshire: Palgrave Macmillan. UK.

Asongu, S. A. (2013). Fighting consumer price inflation in Africa: What do dynamics in money, credit, efficiency and size tell us? *Journal of Financial Economic Policy, 5*(1), 39-60.

Asongu, S. A. (2014). Financial development dynamic thresholds of financial globalization: Evidence from Africa. *Journal of Economic Studies, 41*(2), 166-195.

Asongu, S. (2016). New empirics of monetary policy dynamics: Evidence from the CFA franc zones. *African Journal of Economic and Management Studies, 7*(2), 164-204.

Atta-Mensah, J. (2004). Money demand and economic uncertainty. Bank of Canada. *Working Paper*, 2004-25.

Aydın, C., Esen, Ö. & Bayrak, M. (2016). Inflation and economic growth: A dynamic panel threshold analysis for Turkish Republics in transition process. *Procedia-Social and Behavioral Sciences, 229*, 196-205.

Azim Özdemir, K., & Saygılı, M. (2013). Economic uncertainty and money demand stability in Turkey. *Journal of Economic Studies, 40*(3), 314-333.

Bahmani-Oskooee, M. (2001). How stable is M2 money demand function in Japan? *Japan and the World Economy*, *13*(4), 455-461.

Bahmani-Oskooee, M., & Bahmani, S. (2015). Nonlinear ARDL approach and the demand for money in Iran. *Economics Bulletin, 35*(1), 381-391.

Bahmani-Oskooee, M., & Baek, J. (2016). Global financial crisis of 2008, asymmetric effects of exchange rate changes, and stability of the demand for money in Japan. *Journal of Reviews on Global Economics, 5*, 273-280.

Bahmani-Oskooee, M., & Gelan, A. (2009). How stable is the demand for money in African countries? *Journal of Economic Studies,* 36(3), 216-235.

Bahmani-Oskooee, M., & Rehman, H. (2005). Stability of the money demand function in Asian developing countries. *Applied Economics,* 37(7), 773-792.

Bahmani- Oskooee, M., & Xi, D. (2011). Economic uncertainty, monetary uncertainty and the demand for money in Australia. *Australian Economic Papers, 50*(4), 115-128.

Bahmani-Oskooee, M., Kutan, A. M., & Xi, D. (2013). The impact of economic and monetary uncertainty on the demand for money in emerging economies. *Applied Economics*, *45*(23), 3278-3287.

Bahmani-Oskooee, M., Xi, D., & Wang, Y. (2012). Economic and monetary uncertainty and the demand for money in China. *Chinese Economy*, *45*(6), 26-37.

Bahmani, S., & Kutan, A. M. (2010). How stable is the demand for money in emerging economies? *Applied Economics*, *42*(26), 3307-3318.

Bahmani-Oskooee, M., Satawatananon, K., & Xi, D. (2015). Economic uncertainty, monetary uncertainty, and the demand for money in Thailand. *Global Business and Economics Review*, *17*(4), 467-476.

Baharumshah, A. Z., & Rashid, S. (1999). Exports, imports and economic growth in Malaysia: Empirical evidence based on multivariate time series. *Asian Economic Journal*, *13*(4), 389-406.

Bailey, R. W., Driscoll, M. J., Ford, J. L., & Mullineux, A. W. (1982). The aggregation error in Divisia monetary aggregates: Some findings for the UK 1963–1980. *Economics Letters*, *10*(1-2), 123-128.

Bailey, R. W., Driscoll, M. J., Ford, J. L., & Mullineux, A. W. (1982b). The information content of monetary aggregates in the UK. *Economics Letters*, *9*(1), 61-67.

Ball, L. (2012). Short-run money demand. *Journal of Monetary Economics*, *59*(7), 622-633.

Ball, L., & Romer, D. (1990). Real rigidities and the non-neutrality of money. *The Review of Economic Studies*, *57*(2), 183-203.

Baldini, A., & Poplawski-Ribeiro, M. (2011). Fiscal and monetary determinants of inflation in low-income countries: Theory and evidence from sub-Saharan Africa. *Journal of African Economies*, *20*(3), 419-462.

Barnichon, R., & Peiris, S. J. (2008). Sources of inflation in sub-Saharan Africa. *Journal of African economies*, *17*(5), 729-746.

Barro, R. J. (2013). Inflation and economic growth. *Annals of Economics & Finance*, *14*(1), 85-109.

Barnett, W. A. (1978). The user cost of money. *Economics letters*, *1*(2), 145-149.

Barnett, W. A. (1980). Economic monetary aggregates an application of index number and aggregation theory. *Journal of econometrics*, 14(1), 11-48.

Barnett, W. A. (1982). The optimal level of monetary aggregation. *Journal of Money, Credit and Banking*, *14*(4), 687-710.

Barnett, W. A. (1984). Recent monetary policy and the Divisia monetary aggregates. *The American Statistician, 38*(3), 165-172.

Barnett, W. A., Offenbacher, E. K., & Spindt, P. A. (1984). The new Divisia monetary aggregates. *Journal of Political Economy, 92*(6), 1049-1085

Barnett, W. A. (1997). Which road leads to stable money demand? *The Economic Journal, 107*(443), 1171-1185.

Barnett, W. A. (2012). *Getting it wrong: How faulty monetary statistics undermine the fed, the financial system, and the economy*. MIT Press, USA.

Barnett, W. A., & Gaekwad-Babulal, N. (2014). Divisia monetary aggregates for the European monetary union. In *inaugural conference of the Society of Economic measurement, Chicago,* 4, 18-20.

Barnett, W. A., & Alkhareif, R. M. (2015). Modern and traditional methods for measuring money supply: The case of Saudi Arabia. *International Journal of Financial Studies, 3*(1), 49-55.

Barnett, W. A., & Chauvet, M. (2011). How better monetary statistics could have signalled the financial crisis. *Journal of Econometrics*, 161(1), 6-23.

Barnett, W. A., Chauvet, M., & Tierney, H. L. (2009). Measurement error in monetary aggregates: A markov switching factor approach. *Macroeconomic Dynamics, 13*(S2), 381-412.

Barnett, W. A., Fisher, D., & Serletis, A. (1992). Consumer theory and the demand for money. *Journal of Economic Literature, 30*(4), 2086-2119.

Barnett, W. A., & Serletis, A. (Eds.). (2000). *The theory of monetary aggregation*. Emerald Group Publishing Limited. Bingley, United Kingdom.

Barnett, W. A., & Tang, B. (2016). Chinese Divisia monetary index and GDP now casting. *Open Economies Review*, *27*(5), 825-849.

Barnett, W. A., Liu, J., Mattson, R. S., & van den Noort, J. (2013). The new CFS Divisia monetary aggregates: Design, construction, and data sources. *Open Economies Review*, 24(1), 101-124.

Barnett, W. A., Offenbacher, E. K., & Spindt, P. A. (1984). The new Divisia monetary aggregates. *Journal of Political Economy*, *92*(6), 1049-1085.

Barth, J. R., & Bennett, J. T. (1974). The role of money in the Canadian economy: An empirical test. *The Canadian Journal of Economics*, *7*(2), 306-311.

Basher, S. A., & Fachin, S. (2014). Investigating long-run demand for broad money in the Gulf Arab countries. *Middle East Development Journal*, *6*(2), 199-214.

Batuo, M., Mlambo, K., & Asongu, S. (2017). Linkages between financial development, financial instability, financial liberalization and economic growth in Africa. *Research in International Business and Finance*, doi, http://dx.doi.org/10.1016/j.ribaf.2017.07.148.

Baumol, W. J. (1952). The transactions demand for cash: An inventory theoretic approach. *The Quarterly Journal of Economics*, 66(4), 545-556.

Benati, L. (2008). The "great moderation" in the United Kingdom. *Journal of Money, Credit and Banking*, *40*(1), 121-147.

Bengali, K., Khan, A. H., & Sadaqat, M. (1999). Money, income, prices, and causality: The Pakistani experience. *The Journal of Developing Areas*, 33(4), 503-514.

Belongia, M. T. (1996). Measurement matters: Recent results from monetary economics re-examined. *Journal of Political Economy*, 104(5), 1065-1083.

Belongia, M. T., & Binner, J. M. (Eds.). (2000). *Divisia monetary aggregates: Theory and practice*. Palgrave, UK.

Belongia, M. T., & Chalfant, J. A. (1989). The changing empirical definition of money: Some estimates from a model of the demand for money substitutes. *Journal of Political Economy, 97*(2), 387-397.

Belongia, M. T., & Chrystal, K. A. (1991). An admissible monetary aggregate for the United Kingdom. *The Review of Economics and Statistics,* 73(3), 497-503.

Belongia, M. T., & Ireland, P. N. (2006). The own-price of money and the channels of monetary transmission. *Journal of Money, Credit and Banking*, 38(2), 429-445.

Belongia, M. T., & Ireland, P. N. (2012). Quantitative easing: Interest rates and money in the measurement of monetary policy. *Boston College Working Papers in Economics, 801.*

Belongia, M. T., & Ireland, P. N. (2013). Instability: Monetary and Real. *Boston college working papers in economics,* 830.

Belongia, M. T., & Ireland, P. N. (2014a). The Barnett critique after three decades: A new Keynesian analysis. *Journal of Econometrics,* 183(1), 5-21.

Belongia, M. T., & Ireland, P. N. (2014b). Money and output: Friedman and Schwartz revisited. *Manuscript. Boston College,* Department of Economics, Chestnut Hill.

Belongia, M. T., & Ireland, P. N. (2015). Interest rates and money in the measurement of monetary policy. *Journal of Business & Economic Statistics*, *33*(2), 255-269.

Bernanke, B. S., Gertler, M., & Gilchrist, S. (1999). The financial accelerator in a quantitative business cycle framework. *Handbook of macroeconomics*, *1*, 1341- 1393.

Bernanke, B. S., & Blinder, A. S. (1988). Credit, money, and aggregate demand. *National Bureau of Economic Research*, 2534.

Bernanke, B. S., & Blinder, A. S. (1992). The federal funds rate and the channels of monetary transmission. *The American Economic Review*, 82(4), 901-921.

Binner, J. M., Gazely, A. M., Chen, S. H., & Chie, B. T. (2004). Financial innovation and Divisia money in Taiwan: Comparative evidence from neural network and vector error- correction forecasting models. *Contemporary Economic Policy*, *22*(2), 213-224.

Bilquees, F., Mukhtar, T., & Sohail, S. (2012). Dynamic causal interactions of money, prices, interest rate and output in Pakistan. *Journal of Economic Cooperation & Development*, *33*(3), 37-52.

Bloom, N. (2014). Fluctuations in uncertainty. *Journal of Economic Perspectives*, *28*(2), 153-76.

Boughton, J. M. (1981). Money and its substitutes. *Journal of Monetary Economics*, *8*(3), 375-386.

Bourreau, M., Doğan, P., & Hong, S. (2015). Making money by giving it for free: Radiohead's pre-release strategy for in rainbows. *Information Economics and Policy, 32*, 77-93.

Bowerman, B. L., & O'Connell, R. T. (1979). *Time series and forecasting*. North Scituate, MA: Duxbury Press, USA.

Brown, R. L., Durbin J., & Evans, J.M. (1975). Techniques for testing the constancy of regression relations over time. *Journal of the Royal Statistical Society,* 37(2), 149-192.

Brüggemann, I., & Nautz, D. (1997). Money growth volatility and the demand for money in Germany: Friedman's volatility hypothesis revisited. *Review of World Economics*, *133*(3), 523-537.

Brüggemann, I. (2003). Measuring monetary policy in Germany: A structural vector error correction approach. *German Economic Review*, *4*(3), 307-339.

Burdekin, R. C., Denzau, A. T., Keil, M. W., Sitthiyot, T., & Willett, T. D. (2004). When does inflation hurt economic growth? Different nonlinearities for different economies. *Journal of Macroeconomics*, *26*(3), 519-532.

Cagan, P. (1989). Money-Income causality-A critical review of the literature since" A monetary history". In *Money, History, and International Finance: Essays in Honor of Anna J. Schwartz*, 117-160. University of Chicago Press.

Chen, W., & Nautz, D. (2015). The information content of monetary statistics for the Great recession: Evidence from Germany. *SFB Working paper, 649,* Humboldt University, Berlin, Germany.

Chetty, V. K. (1969). On measuring the nearness of near-moneys. *The American Economic Review*, *59*(3), 270-281.

Chen, Y. B., Tang, S. L., & Li, D. (2009). Can money supply forecast inflation in China?. *Economic Theory and Business Management*, *2*, 22-28.

Chimobi, O. P. (2010). The causal relationship among financial development, trade openness and economic growth in Nigeria. *International Journal of Economics and Finance*, *2*(2), 137-168.

Chuku, C. A. (2009). Measuring the effects of monetary policy innovations in Nigeria: A structural vector autoregressive (SVAR) approach. *African Journal of Accounting, Economics, Finance and Banking Research.* 5(5), 112-129.

Chou, N. T. (1991). An alternative monetary policy target. *Applied economics*, *23*(11), 1699-1705.

Choi, W. G., & Oh, S. (2003). A money demand function with output uncertainty, monetary uncertainty, and financial innovations. *Journal of Money, Credit and Banking*, 35(5), 685-709.

Chow, G. C., & Shen, Y. (2005). Money, price level and output in the Chinese macro economy. *Asia-Pacific Journal of Accounting & Economics*, *12*(2), 91-111.

Christiano, L. J., Eichenbaum, M., & Evans, C. L. (1999). Monetary policy shocks: What have we learned and to what end? *Handbook of macroeconomics*, *1*, 65-148.

Chrystal, K. A., & MacDonald, R. (1994). Empirical evidence on the recent behavior and usefulness of simple-sum and weighted measures of the money stock. *Review-Federal Reserve Bank of Saint Louis*, *76*, 73-73.

Clarida, R., Gali, J., & Gertler, M. (1999). The science of monetary policy: A new Keynesian perspective. *National bureau of economic research*, 7147.

Clarke, J. A., & Mirza, S. (2006). A comparison of some common methods for detecting Granger non causality. *Journal of Statistical Computation and Simulation, 76*(3), 207-231.

Clements, K. W. (1982). Divisia moments of Australian consumption. *Economics Letters*, *9*(1), 43-48.

Cleveland, C. J., Kaufmann, R. K., & Stern, D. I. (2000). Aggregation and the role of energy in the economy. *Ecological Economics*, *32*(2), 301-317.

Cobham, D., & Kang, Y. (2012). Financial crisis and quantitative easing: Can broad money tell us anything? *The Manchester School*, 80(1), 54-76.

Cochrane, J. H. (1998). What do the VARs mean? Measuring the output effects of monetary policy. *Journal of monetary economics*, *41*(2), 277-300.

Cover, J. P. (1992). Asymmetric effects of positive and negative money-supply shocks. *The Quarterly Journal of Economics*, *107*(4), 1261-1282.

Dagher, J., & Kovanen, A. (2011). On the stability of money demand in Ghana: A bounds testing approach. *IMF Working Papers*, 11/273, 1-18.

Dahalan, J., Sharma, S. C., & Sylwester, K. (2005). Divisia monetary aggregates and money demand for Malaysia. *Journal of Asian Economics*, 15(6), 1137-1153.

Dahalan, J., Sharma, S. C., & Sylwester, K. (2007). Scale variable specification in a money demand function for Malaysia. *Journal of Asian Economics*, 18(6), 867-882.

Darrat, A. F., Chopin, M. C., & Lobo, B. J. (2005). Money and macroeconomic performance: Revisiting Divisia money. *Review of Financial Economics*, *14*(2), 93-101.

Darrat, A. F. (1986). Money, inflation, and causality in the North African countries: An empirical investigation. *Journal of Macroeconomics*, *8*(1), 87-103.

Darrat, A. F., & Al-Sowaidi, S. S. (2009). Financial progress and the stability of long-run money demand: Implications for the conduct of monetary policy in emerging economies. *Review of Financial Economics*, *18*(3), 124-131.

Darvas, Z. (2015). Does money matter in the euro area? Evidence from a new Divisia index. *Economics Letters*, *133*, 123-126.

Delke, R., & Pradhan, M. (1999). Financial liberalization and money demand in the ASEAN countries. *International Journal of Finance and Economics*, *4(6)*, 205-215.

DeLurgio, S. A. (1998). *Forecasting principles and applications*. Irwin Professional Publishing, Illinois.

Diamandis, P. F. (2009). International stock market linkages: Evidence from Latin America. *Global Finance Journal*, *20*(1), 13-30.

Dickey, D. A., & Fuller, W. A. (1979). Distribution of the estimators for autoregressive time series with a unit root. *Journal of the American statistical association*, *74*(366), 427-431.

Dickey, D. A., & Fuller, W. A. (1981). Likelihood ratio statistics for autoregressive time series with a unit root. *Econometrica: Journal of the Econometric Society*, 49(4), 1057-1072.

Dickinson, D., & Jia, L. (2007). The real effects of monetary policy in China: An empirical analysis. *China Economic Review*, 18(1), 87-111.

Dickson Khainga (2014). Divisia monetary aggregates and demand for money in Kenya. Africa growth initiative *working paper*, 13, Brookings institution.

Diewert, W. E. (1976). Exact and superlative index numbers. *Journal of econometrics*, *4*(2), 115-145.

Doguwa, S. I., Olowofeso, O. E., Uyaebo, S. O., Adamu, I., & Bada, A. S. (2014). Structural breaks, cointegration and demand for money in Nigeria. *CBN Journal of Applied Statistics*, *5*(1), 15-33.

Drake, L., & Mills, T. C. (2005). A new empirically weighted monetary aggregate for the United States. *Economic Inquiry*, *43*(1), 138-157.

Driscoll, M. J., Ford, J. L., Mullineux, A. W., & Kohler, W. (1985). Monetary aggregates, 1965–1980. *Empirical Economics*, *10*(1), 13-25.

Dritsakis, N. (2011). Demand for money in Hungary: An ARDL Approach. *Review of Economics and Finance*, (5), 1-28.

Dube, S. (2013). The stability of broad money demand (M3) in South Africa: Evidence from a shopping-time technology and an ARDL model. *Journal of Applied Finance and Banking*, *3*(6), 225-247.

Durevall, D., & Sjö, B. (2012). The dynamics of inflation in Ethiopia and Kenya. African Development Bank Group *Working paper* 151, 1-29.

Dwyer Jr, G. P., & Hafer, R. W. (1999). Are money growth and inflation still related?. *Economic Review-Federal Reserve Bank of Atlanta*, *84*(2), 32-48.

Dyreyes, F. R., Starleaf, D. R., & Wang, G. H. (1980). Tests of the direction of causation between money and income in six countries. *Southern Economic Journal*, 47(2), 477-487.

Enders, W. (2008). *Applied econometric time series*. John Wiley & Sons, UK.

Engle, R. F., & Granger, C. W. (1987). Co-integration and error correction: Representation, estimation, and testing. *Econometrica: Journal of the Econometric Society*, 55(2), 251-276.

Estrella, A., & Mishkin, F. S. (1997). Is there a role for monetary aggregates in the conduct of monetary policy?. *Journal of monetary economics*, *40*(2), 279-304.

El-Shagi, M., & Giesen, S. (2013). Money and inflation: Consequences of the recent monetary policy. *Journal of Policy Modeling*, *35*(4), 520-537.

Fackler, J. S., McMillin, W. D., & Silver, J. L. (1990). Are monetary services indexes superior to conventional monetary aggregates as intermediate targets?. *Applied Economics*, *22*(12), 1751-1759.

Faria, J. R., & Carneiro, F. G. (2001). Does high inflation affect growth in the long and short run?. *Journal of applied economics*, *4*(1), 89-105.

Fase, M. M. G. (1985). Monetary control: The Dutch experience. In *Monetary conditions for economic recovery.* 95-125, Springer Netherlands.

Fase, M. M., & Winder, C. C. A. (1994). Money demand within EMU: An analysis with the Divisia measure. *De Nederlandsche Bank Quarterly Bulletin*, 8, 25-55.

Feige, E. L., & Pearce, D. K. (1979). The casual causal relationship between money and income: Some caveats for time series analysis. *The Review of Economics and Statistics*, 61(4), 521-533.

Fisher, I. (1911). “The Equation of Exchange," 1896-1910. *The American Economic Review*, *1*(2), 296-305.

Fisher, I. (1922). *The making of index numbers: a study of their varieties, tests, and reliability.* Houghton Mifflin, USA.

Fisher, I. (1965). *The theory of interest.* The Macmillan, New York.

Friedman, M. (1982). Monetary policy: Theory and practice. *Journal of Money, Credit and Banking, 14*(1), 98-118.

Friedman, M. (1989). *Quantity theory of money*. Palgrave Macmillan, UK.

Friedman, B. M. (1997). The rise and fall of money growth targets as guidelines for US monetary policy. In *Towards more effective monetary policy*, 137-175, Palgrave Macmillan UK.

Friedman, B. M., & Kuttner, K. N. (1992). Money, income, prices, and interest rates. *The American Economic Review*, 82(3), 472-492.

Friedman, B. M., & Kuttner, K. N. (1993). Another look at the evidence on money-income causality. *Journal of Econometrics*, *57*(1-3), 189-203.

Friedman, M. (Ed.). (1956). *Studies in the quantity theory of money*. University of Chicago Press.

Friedman, M., & Schwartz, A. J. (1969). The definition of money: Net wealth and neutrality as criteria. *Journal of Money, Credit and Banking*, *1*(1), 1-14.

Friedman, M., & Meiselman, D. (1963). The relative stability of the investment multiplier and monetary velocity in the United States, 1897-1958. *Stabilization Policies, Englewood Cliffs.* New Jersey: Prentice-Hall.

Friedman, M., & Schwartz, A. J. (1982). *Monetary Trends in the United States and United Kingdom: Their Relation to Income, Prices, and Interest Rates, 1867-1975*. University of Chicago Press.

Friedman, M. (1983). Monetary Variability: United States and Japan: Note. *Journal of Money, Credit and Banking*, *15*(3), 339-343.

Friedman, B. M. (1984). Lessons from the 1979-1982 monetary policy experiment. NBER *working paper*, 1272, 397-400.

Froyen, R.T. (2005). *Macroeconomics Theories and Policies*. Pearson Education. London.

Fluri, R., & Spoerndli, E. (2000). Simple-sum versus Divisia money in Switzerland: Some empirical results. In *Divisia Monetary Aggregates*, 102-119. Palgrave Macmillan UK.

Ford, J. L., & Morris, J. L. (1996). The money multiplier, simple sum, and Divisia and innovation-Divisia monetary aggregates: Cointegration tests for the UK. *Applied Economics*, *28*(6), 705-714.

Fry, M. J. (1978). Money and capital or financial deepening in economic development?. *Journal of money, credit and banking*, *10*(4), 464-475.

Gan, P. T. (2014). The optimal economic uncertainty index: A grid search application. *Computational Economics*, *43*(2), 159-182.

Galí, J. (2015). *Monetary policy, inflation, and the business cycle: An introduction to the new Keynesian framework and its applications*. Princeton University Press.

Gandolfo, G. (1981). *Qualitative analysis and econometric estimation of continuous time dynamic-models.* North-Holland, Amsterdam.

Ganev, G. Y., Molnar, K., Rybinski, K., & Wozniak, P. (2002). Transmission mechanism of monetary policy in Central and Eastern Europe. Centre for social and Economic Research, *CASE reports*, 52, Warsaw.

Gazely, A. M., & Binner, J. M. (2000). The application of neural networks to the Divisia index debate: Evidence from three countries. *Applied Economics*, *32*(12), 1607- 1615.

Gebregiorgis, B. S., & Handa, J. (2005). Monetary aggregation for a developing economy: A case study of Nigeria. *The Journal of Developing Areas*, 38(2), 119-141.

Geweke, J. (1986). The super neutrality of money in the United States: An interpretation of the evidence. *Econometrica: Journal of the Econometric Society*, 54(1), 1-21.

Ghazali, M. F., Amin, H., Muhammad, M. Z., & Samsu, S. H. (2009). Linkage between money and prices: A causality analysis for Malaysia. *International Business Research*, *1*(4), 82-96.

Ghosh, A., & Phillips, S. (1998). Warning: Inflation may be harmful to your growth. *IMF Staff Papers*, *45*(4), 672-710.

Giles, J. A., & Williams, C. L. (2000). Export-led growth: a survey of the empirical literature and some non-causality results. *Journal of International Trade & Economic Development*, *9*(4), 445-470.

Gillman, M., & Nakov, A. (2004). Granger causality of the inflation–growth mirror in accession countries. *Economics of Transition*, *12*(4), 653-681.

Granger, C. W. (1969). Investigating causal relations by econometric models and cross- spectral methods. *Econometrica: Journal of the Econometric Society*, 37(3), 424-438.

Granger, C. W. (1980). Testing for causality: A personal viewpoint. *Journal of Economic Dynamics and control*, *2*, 329-352.

Greiber, C., & Lemke, W. (2005). Money demand and macroeconomic uncertainty. Bundesbank, *working paper, 1*.

Gogas, P., Papadimitriou, T., & Takli, E. (2013). Comparison of simple sum and Divisia monetary aggregates in GDP forecasting: A support vector machines approach. *Economics Bulletin*, *33*(2), 1101-1115.

Goldfeld, S. M., & Sichel, D. E. (1990). The demand for money. *Handbook of monetary economics*, *1*, 299-356.

Goldfeld, S. M., Duesenberry, J., & Poole, W. (1973). The demand for money revisited. *Brookings Papers on Economic Activity*, *1973*(3), 577-646.

Goldfeld, S. M., Fand, D. I., & Brainard, W. C. (1976). The case of the missing money. *Brookings papers on economic activity*, *1976*(3), 683-739.

González, C., Silva, L., Vargas, C., & Velasco, A. M. (2014). Uncertainty in the money supply mechanism and interbank markets in Colombia. *Essays on economic policy, 32*(73), 36-49.

Goodfriend, M., & King, R. G. (2001). *The case for price stability*. NBER *working paper*, 8423.

Goodwin, P., & Wright, G. (2010). The limits of forecasting methods in anticipating rare events. *Technological forecasting and social change*, *77*(3), 355-368.

Gowland, D. (1991). *Money, inflation and unemployment: The role of money in the economy*. Palgrave Macmillan.

Gupta, R., Jurgilas, M., & Kabundi, A. (2010). The effect of monetary policy on real house price growth in South Africa: A factor-augmented vector autoregression (FAVAR) approach. *Economic modelling*, *27*(1), 315-323.

Habibullah, M. S. (1999). *Divisia monetary aggregates and economic activities in Asian developing economies*. Ashgate Publishing.

Habibullah, M. S. (1998). Divisia money and income in Indonesia: Some results from error-correction models, 1981: 1-1994: 4. *Applied Economics Letters*, *5*(6), 387-391.

Hafer, R. W., & Hein, S. E. (1982). The stability of the demand for money: Evidence from the post-1973 period: A comment. *The Review of Economics and Statistics*, 64(2), 355-357.

Hafer, R. W., & Kutan, A. M. (2002). Detrending and the money-output link: International evidence. *Southern Economic Journal*, 69(1), 159-174.

Handa, J. (2009). *Monetary Economics*, Routledge, NY, USA.

Hancock, M. (2005). Divisia money. *Bank of England Quarterly Bulletin*. Spring 2005, 1-8.

Haniffa, R., & Hudaib, M. (2006). Corporate governance structure and performance of Malaysian listed companies. *Journal of Business Finance & Accounting*, *33*(7- 8), 1034-1062.

Hamdi, H., & Jlassi, N. B. (2014). Financial liberalization, disaggregated capital flows and banking crisis: Evidence from developing countries. *Economic Modelling*, 41, 124-132.

Haug, A. A., & Lucas, R. F. (1996). Long-run money demand in Canada: In search of stability. *The review of Economics and Statistics*, 78(2), 345-348.

Hayo, B. (1999). Money-output Granger causality revisited: An empirical analysis of EU countries. *Applied Economics*, *31*(11), 1489-1501.

Hendrickson, J. R., & Beckworth, D. M. (2013). The supply of transaction assets, nominal income, and monetary policy transmission. University of Mississippi and University of Western Kentucky, *working paper*, 104.

Hendrickson, J. R. (2014). Redundancy or mismeasurement? A reappraisal of money. *Macroeconomic Dynamics*, 18(07), 1437-1465.

Hendrickson, J. R., & Salter, A. W. (2016). Money, liquidity, and the structure of production. *Journal of Economic Dynamics and Control*, *73*, 314-328.

Herrmann, H., Reimers, H. E., & Toedter, K. H. (2000). Weighted monetary aggregates for Germany. In *Divisia Monetary Aggregates* .79-101, Palgrave Macmillan UK.

Herwartz, H., Sardà, J., & Theilen, B. (2016). Money demand and the shadow economy: Empirical evidence from OECD countries. *Empirical Economics*, *50*(4), 1627-1645.

Hirayama, K., & Kasuya, M. (1996). Financial deregulation and Divisia monetary aggregates in Japan. In *Financial Innovation, Banking and Monetary Aggregates*, 104-130, Edward Elger Publishing Limited, UK.

Hill, R. C., Griffiths, W. E., & Lim, G. C. (2011). *Principles of econometrics*. Fourth Edition. John Wiley & Sons Inc. USA.

Hossain, A. (2005). The Granger-causality between money growth, inflation, currency devaluation and economic growth in Indonesia: 1954-2002. *International Journal of Applied Econometrics and Quantitative Studies*, *2*(3), 45-68.

Hossain, A. A. (2012). Modelling of narrow money demand in Australia: An ARDL cointegration approach, 1970–2009. *Empirical Economics*, *42*(3), 767-790.

Hossain, A. A., & Arwatchanakarn, P. (2017). Does Money Have a Role in Monetary Policy for Price Stability under Inflation Targeting in Thailand?. *Journal of Asian Economics*, *53*, 37-55.

Howard, D. H., & Johnson, K. H. (1983). The behavior of monetary aggregates in major industrialized countries. *Journal of Money, Credit and Banking*, *15*(4), 455-468.

Hung, H. F., & Thompson, D. (2016). Money supply, class power, and inflation: Monetarism reassessed. *American Sociological Review*, *81*(3), 447-466.

Hurn, A. S. (1991). Causality, predictability and monetary targets in South Africa. *South African Journal of Economics*, *59*(4), 229-241.

Hyndman, R. J., Athanasopoulos, G., Razbash, S., Schmidt, D., Zhou, Z., Khan, Y., & Bergmeir, C. (2013): Forecasting functions for time series and linear models, 2013, *user manual, R* package version 4.06.

Ishida, K. (1984). Divisia monetary aggregates and demand for money: A Japanese case. *Bank of Japan Monetary and Economic Studies*, *2*(1), 44-86.

Ishida, K., & Nakamura, K. (2000). Broad and narrow Divisia monetary aggregates for Japan. In *Divisia Monetary Aggregates* .173-199, Palgrave Macmillan, UK.

IMF (2016): Regional economic outlook: Sub-Saharan Africa. Available at PDF web ISBN: 978-1-47553-834-2. Retrieved at: https://www.imf.org/en/Publication/REO/SSA/Issues/2017/02...

Jackman, M. (2010). Money demand and economic uncertainty in Barbados.*The Empirical Economic Letters.* 10*(4*). 225-236

James, G. A. (2005). Money demand and financial liberalization in Indonesia. *Journal of Asian Economics, 16*(5), 817-829.

Janssen, N. G., & Kool, C. J. (2000). Weighted Dutch and German monetary aggregates: How do they perform as monetary indicators for the Netherlands in *Divisia Monetary Aggregates*. 120-137, Palgrave Macmillan, UK.

Janssen, N. G., & Kool, C. J. M. (1996). Measuring money in the Netherlands. In *Essays on Money, Banking, and Regulation*. 3-25, Springer US.

Jawadi, F., & Sousa, R. M. (2013). Money demand in the euro area, the US and the UK: Assessing the role of nonlinearity. *Economic Modelling*, 32(8), 507-515.

Johansen, S., & Juselius, K. (1990). Maximum likelihood estimation and inference on cointegration—with applications to the demand for money. *Oxford Bulletin of Economics and statistics*, *52*(2), 169-210.

Jonsson, G. (2001). Inflation, money demand, and purchasing power parity in South Africa. *IMF Staff papers*, *48*(2), 243-265.

Judd, J. P., & Scadding, J. L. (1982). The search for a stable money demand function: A survey of the post-1973 literature. *Journal of Economic Literature, 20*(3), 993-1023.

Kabundi, A., & Schaling, E. (2013). Inflation and inflation expectations in South Africa: An attempt at explanation. *South African Journal of Economics, 81*(3), 346-355.

Keating, J. W., Kelly, L. J., & Valcarcel, V. J. (2014). Solving the price puzzle with an alternative indicator of monetary policy. *Economics Letters*, *124*(2), 188-194.

Kelikume, I., Alabi, F. A., & Ike-Anikwe, R. C. (2015). An empirical analysis of monetary policy reaction function: Evidence from Nigeria. *In Global Conference on Business & Finance Proceedings*.10 (1), 299-346.

Keynes, J. M. (1936). *General theory of employment, interest and money*. Atlantic Publishers & Dist. UK.

Kitchen, T. (1985). A comparison of the velocities of monetary aggregates: Using UK data for the period 1963-1982. *Economics Letters*, *18*(2-3), 191-195.

King, R. G., & Watson, M. W. (1996). Money, prices, interest rates and the business cycle. *The Review of Economics and statistics*, 78(1), 35-53.

Klein, B. (1974). Competitive interest payments on bank deposits and the long-run demand for money. *The American Economic Review*, *64*(6), 931-949.

Knell, M., & Stix, H. (2006). Three decades of money demand studies: Differences and similarities. *Applied Economics*, 38(7), 805-818.

Kumar, S., Webber, D. J., & Fargher, S. (2013). Money demand stability: A case study of Nigeria. *Journal of Policy Modeling*, 35(6), 978-991.

Kumar, S. (2011). Financial reforms and money demand: Evidence from 20 developing countries. *Economic Systems, 35*(3), 323-334.

Laidler, D. (1993). Hawtrey, Harvard, and the origins of the Chicago tradition. *Journal of Political Economy*, 101(6), 1068-1103.

Laidler, D. (2013). Reassessing the thesis of the monetary history. In A paper based on speaking notes prepared for the *conference Retrospectives on the Great Depression*, Princeton University.

Lee, T. H., & Yang, W. (2012). Money–income Granger-causality in quantiles. *Advances in Econometrics.* 30, 385-409. Emerald Group Publishing Limited.

Leeper, E. M., & Roush, J. E. (2003). Putting'M'back in monetary policy. *National Bureau of Economic Research working paper, 9552.*

Leong, C. M., Puah, C. H., Mansor, S. A., & Lau, E. (2010). Testing the effectiveness of monetary policy in Malaysia using alternative monetary aggregation. *The Journal of Applied Economic Research, 4*(3), 321-338.

Lemke, W., & Greiber, C. (2005). Money demand and macroeconomic uncertainty. Deutschen Bundesbank *working paper* 2005(26).

Lieb, L., & Candelon, B. (2015). Testing for short-run threshold effects in a vector error-correction framework: a reappraisal of the stability of the US money demand. *Studies in Nonlinear Dynamics & Econometrics, 19(3), 355-376.*

Litterman, R. B., & Weiss, L. (1985). Money, real interest rates, and output: A reinterpretation of postwar US data. *Econometrica*. 53, 129-156.

Lucas, R. E. (1980). Two illustrations of the quantity theory of money. *The American Economic Review*, *70*(5), 1005-1014.

Lucas, R. E., & Nicolini, J. P. (2015). On the stability of money demand. *Journal of Monetary Economics*, *73*, 48-65.

Lungu, M., Simwaka, K., Chiumia, A., Palamuleni, A., & Jombo, W. (2012). Money demand function for Malawi: Implications for monetary policy conduct. *Banks and Bank Systems*, *7*(1), 50-63.

Lütkepohl, H., Teräsvirta, T., & Wolters, J. (1999). Investigating stability and linearity of a German M1 money demand function. *Journal of Applied Econometrics*, 14(5), 511-525.

Lütkepohl, H., & Krätzig, M. (Eds.). (2004). *Applied time series econometrics*. Cambridge University Press.

Mallick, S. K., & Sousa, R. M. (2013). The real effects of financial stress in the Eurozone. *International Review of Financial Analysis*, *30*, 1-17.

Marshall, A. (1920). *Principles of Economics: An Introductory Volume*. Macmillan.

Masih, A. M., & Masih, R. (1998). Does money cause prices, or the other way around? Multi-country econometric evidence including error-correction modelling from South-east Asia. *Journal of Economic Studies*, *25*(3), 138-160.

Mattson, R. S., & De Peretti, P. (2014). Investigating the role of real Divisia money in persistence-robust Econometric models. *University of Paris working paper*, 00984827, HAL.

Mattson, R. S., & Valcarcel, V. J. (2016). Compression in monetary user costs in the aftermath of the financial crisis: Implications for the Divisia M4 monetary aggregate. *Applied Economics Letters*, *23*(18), 1294-1300.

Mishra, P. K., Mishra, U. S., & Mishra, S. K. (2010). Money, price and output: A causality test for India. *International Research Journal of Finance and Economics*, *53*(2), 27-36.

Mishkin, F. S. (2009). Globalization, macroeconomic performance, and monetary policy. *Journal of Money, Credit and Banking*, *41*(s1), 187-196.

Mishkin, F. S. (1997). The causes and propagation of financial instability: Lessons for policymakers. *Maintaining financial stability in a global economy*, 55-96.

Montiel, P. J. (2011). *Macroeconomics in emerging markets*. Cambridge University Press.

Moll, P. G. (2000). The demand for money in South Africa: Parameter stability and predictive capacity. *South African Journal of Economics*, *68*(2), 80-89

Moroney, J. R., & Wilbratte, B. J. (1976). Money and money substitutes: A time series Analysis of household portfolios. *Journal of Money, Credit and Banking*, *8*(2), 181-198.

Muhd-Zulkhibri, A. M. (2007). Causality link between money, output and prices in Malaysia: An empirical re-examination. *Applied Econometrics and International Development*, *7*(1), 38-52.

Mundell, R. A. (1963). Capital mobility and stabilization policy under fixed and flexible exchange rates. *Canadian Journal of Economics and Political Science*. 29(04), 475-485.

Musi, A. S. (1990). Construction of new monetary aggregates: The case of Mexico. Mexico College, *Working paper*, 11.

Mutuku, C., & Ng'eny, K. L. (2014). Macroeconomic variables and the Kenyan equity market: A time series analysis. *Business and Economic Research*, *5*(1), 1-10.

Narayan, P. K. (2007). Is money targeting an option for Bank Indonesia?. *Journal of Asian Economics*, *18*(5), 726-738.

Narayan, P. K. (2005). The saving and investment nexus for China: Evidence from cointegration tests. *Applied economics*, *37*(17), 1979-1990.

Nautz, D., & Rondorf, U. (2011). The (in) stability of money demand in the euro area: Lessons from a cross-country analysis. *Empirica*, *38*(4), 539-553.

Ndele, S. M. (1991). Effects of non-bank financial intermediaries on demand for money in Kenya. *AERC WP*, *5*, *Initiatives*, Nairobi, KE.

Ndikumana, L., & Heintz, J. (2010). Is there a case for formal inflation targeting in Sub-Saharan Africa?.University of Massachusetts, *Political Economy Research Institute Working Paper*, 218.

Ndirangu, L., & Nyamongo, E. M. (2015). Financial innovations and their implications for monetary policy in Kenya. *Journal of African Economies*, *24*(1), 146-171.

Ndjokou, M. M. (2013). Empirical performance of monetary aggregates in BEAC and BCEAO. *Research in Applied Economics*, *5*(2), 101-120.

Ndung'u, N. (1994). A monetarist model of inflation: Kenyan case. *African Development Review*, *6*(2), 109-136.

Ngalawa, H., & Viegi, N. (2011). Dynamic effects of monetary policy shocks in Malawi. *South African Journal of Economics*, *79*(3), 224-250.

Nell, K. S. (1999). The stability of money demand in South Africa, 1965-1997. Department of Economics *Discussion Paper*, 9905,University of Kent.

Nelson, E. (2003). The future of monetary aggregates in monetary policy analysis. *Journal of Monetary Economics*, *50*(5), 1029-1059.

Nelson, E. (2013). Friedman's monetary economics in practice. *Journal of International Money and Finance,* 38, 59-83.

Nelson, C. R., & Plosser, C. R. (1982). Trends and random walks in macroeconomic time series: Some evidence and implications. *Journal of monetary economics*, *10*(2), 139-162.

Newey, W. K., & West, K. D. (1987). Hypothesis testing with efficient method of moments estimation. *International Economic Review*, 28(3), 777-787.

Niyimbanira, F. (2013). Money demand in South Africa revisited: A detailed analysis of different models. *The International Business & Economics Research Journal (Online)*, *12*(4), 427.

Nogueira, R. P. (2009). Is monetary policy really neutral in the long-run? Evidence for some emerging and developed economies. *Economics Bulletin*, *29*(3), 2432-2437.

Nyamongo, E., & Ndirangu, L. N. (2013). Financial innovations and monetary policy in Kenya. *African Economic Research Consortium (AERC) bi annual research workshop* on financial inclusion and innovation in Africa, Kenya.

Omanukwue, P. N. (2010). The quantity theory of money: Evidence from Nigeria. *Economic and Financial Review, 48(2), 91-107.*

Omotor, D. G., & Omotor, P. E. (2011). Structural breaks, demand for money and monetary policy in Nigeria. *Economic review, 62*(9-10), 559-582.

Ozturk, I., & Acaravci, A. (2011). Electricity consumption and real GDP causality nexus: Evidence from ARDL bounds testing approach for 11 MENA countries. *Applied Energy*, *88*(8), 2885-2892.

Owoye, O., & Onafowora, O. A. (2007). M2 targeting, money demand, and real GDP growth in Nigeria: Do rules apply. *Journal of Business and Public affairs*, *1*(2), 1-20.

Pesaran, M. H. (1997). The role of economic theory in modelling the long run. *The Economic Journal*, *107*(440), 178-191.

Pesaran, M. H., Shin, Y., & Smith, R. J. (1999). Pooled mean group estimation of dynamic heterogeneous panels. *Journal of the American Statistical Association*, *94*(446), 621-634.

Pesaran, M. H., Shin, Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of applied econometrics*, *16*(3), 289-326.

Phillips, P. C., & Perron, P. (1988). Testing for a unit root in time series regression. *Biometrika*, *75*(2), 335-346.

Pigou, A. C. (1917). The value of money. *The Quarterly Journal of Economics*, *4*(2), 38-65.

Pinga, V. E., & Nelson, G. C. (2001). Money, prices and causality: Monetarist versus structuralist explanations using pooled country evidence. *Applied Economics, 33*(10), 1271-1281.

Plosser, C. I. (2014). Monetary rules: Theory and practice. *Journal of Economic Dynamics and Control*, 49, 144-146.

Poole, W. (1970). Whiter Money Demand?. *Brookings Papers on Economic Activity, 1970*(3), 485-501.

Precious, C., & Makhetha-Kosi, P. (2014). Impact of monetary policy on economic growth: A case study of South Africa. *Mediterranean Journal of Social Sciences, 5*(15), 76-98.

Psaradakis, Z., Ravn, M. O., & Sola, M. (2005). Markov switching causality and the money–output relationship. *Journal of Applied Econometrics, 20*(5), 665-683.

Puah, C. H., Leong, C. M., Abu Mansor, S., & Lau, E. (2008). Revisiting money demand in Malaysia: Simple-sum versus Divisia monetary aggregates. In *International Conference on Business and Information (BAI2008), Seoul, South Korea*.

Qiao, Y. U., & Albert, K. T. (2000). Monetary services and money demand in China. *China Economic Review*, *11*(2), 134-148.

Rafiq, M. S., & Mallick, S. K. (2008). The effect of monetary policy on output in EMU3: A sign restriction approach. *Journal of Macroeconomics*, *30*(4), 1756-1791.

Ravn, M. O., & Sola, M. (2004). Asymmetric effects of monetary policy in the United States. *Review-Federal Reserve Bank of Saint Louis*, *86*, 41-58.

Reimers, H. E. (2002). Analysing Divisia aggregates for the Euro area. *Deutschen Bundesbank working paper*, 13.

Roper, D. E., & Turnovsky, S. J. (1980). The optimum monetary aggregate for stabilization policy. *The Quarterly Journal of Economics*, *95*(2), 333-355.

Rotemberg, J. J., & Woodford, M. (1991). Mark-ups and the business cycle. In *NBER Macroeconomics Annual 1991, 6*, 63-140, MIT Press.

Rotemberg, J. J., & Woodford, M. (1997). An optimization-based econometric framework for the evaluation of monetary policy. *NBER macroeconomics annual*, *12*, 297-346.

Samargandi, N., Fidrmuc, J., & Ghosh, S. (2015). Is the relationship between financial development and economic growth monotonic? Evidence from a sample of middle-income countries. *World Development*, *68*, 66-81.

Saxegaard, M. (2006). Excess liquidity and effectiveness of monetary policy: Evidence from sub-Saharan Africa. *IMF working pape*r, 06/115.

Schunk, D. L. (2001). The relative forecasting performance of the Divisia and simple sum monetary aggregates. *Journal of Money, Credit and Banking*, 33(2), 272-283.

Serletis, A. (1991). The demand for Divisia money in the United States: A dynamic flexible demand system. *Journal of Money, Credit and Banking*, *23*(1), 35-52.

Serletis, A., & Koustas, Z. (1998). International evidence on the neutrality of money. *Journal of Money, Credit and Banking*, 30(1), 1-25.

Serletis, A., & Gogas, P. (2014). Divisia monetary aggregates, the great ratios, and classical money demand functions. *Journal of Money, Credit and Banking*, 46(1), 229-241.

Serletis, A., & King, M. (1993). The role of money in Canada. *Journal of Macroeconomics*, *15*(1), 91-107.

Serletis, A., Istiak, K., & Gogas, P. (2013). Interest rates, leverage, and money. *Open Economies Review*, *24*(1), 51-78.

Serletis, A., & Rahman, S. (2013). The case for Divisia money targeting. *Macroeconomic Dynamics*, 17(08), 1638-1658.

Serletis, A., & Rahman, S. (2015). On the output effects of monetary variability. *Open Economies Review*, 26(2), 225-236.

Serletis, A., & Robb, A. L. (1986). Divisia aggregation and substitutability among monetary assets. *Journal of Money, Credit and Banking*, *18*(4), 430-446.

Sharma, A., Kumar, A., & Hatekar, N. (2010). Causality between prices, output and money in India: An empirical investigation in the frequency domain. *Center for Computational Social Sciences, working paper*, 14.

Siklos, P. L. (1995). The demand for money in New Zealand in an era of institutional change: Evidence from the 1981–1994 period. *New Zealand Economic Papers*, *29*(1), 21-40.

Siregar, H., & Ward, B. D. (2002). Were aggregate demand shocks important in explaining Indonesian macroeconomic fluctuations?. *Journal of the Asia pacific economy*, *7*(1), 35-60.

Sichei, M. M., & Kamau, A. W. (2012). Demand for money: Implications for the conduct of monetary policy in Kenya. *International Journal of Economics and Finance*, *4*(8), 72-96.

Sims, C. A. (1972). Money, income, and causality. *The American economic review*, *62*(4), 540-552.

Sims, C. A. (1980). Comparison of interwar and postwar business cycles: Monetarism reconsidered. *NBER working paper*, 430.

Sims, C. A. (1992). Interpreting the macroeconomic time series facts: The effects of monetary policy. *European economic review*, *36*(5), 975-1000.

Sianturi, R. H., Tanjung, A. F., Leong, C. M., Puah, C. H., & Brahmana, R. K. (2017). Financial liberalization and Divisia money demand in Indonesia. *Advanced Science Letters*, *23*(4), 3155-3158.

Singh, R., & Kumar, S. (2012). Application of the alternative techniques to estimate demand for money in developing countries. *The Journal of Developing Areas*, 46(2), 43-63.

Singh, R., & Kumar, S. (2010). Some empirical evidence on the demand for money in the Pacific Island countries. *Studies in Economics and Finance, 27*(3), 211-222.

Siklos, P. L., & Barton, A. G. (2001). Monetary aggregates as indicators of economic activity in Canada: Empirical evidence. *Canadian Journal of Economic Review 34*(1), 1-17.

Smith, S. F. (1998). Cointegration tests when data are linearly interpolated. *Unpublished Paper, State University of New York at Albany*.

Sriram, S. S. (2000). A survey of recent empirical money demand studies. *IMF Staff Papers*, 334-365.

Starr, M. A. (2005). Does money matter in the CIS? Effects of monetary policy on output and prices. *Journal of Comparative Economics*, *33*(3), 441-461.

Strohsal, T., & Winkelmann, L. (2015). Assessing the anchoring of inflation expectations. *Journal of International Money and Finance*, *50*, 33-48.

Stock, J. H., & Watson, M. W. (1989). Interpreting the evidence on money-income causality. *Journal of Econometrics*, *40*(1), 161-181.

Söderström, U. (2001). Targeting inflation with a prominent role for money. *Sveriges Riksbank Working Paper*, 123.

Spencer, P. (1994). Portfolio disequilibrium: Implications for the Divisia approach to monetary aggregation. *The Manchester School*, *62*(2), 125-150.

Spindt, P. A. (1985). Money is what money does: Monetary aggregation and the equation of exchange. *Journal of Political Economy*, *93*(1), 175-204.

Submitter, F. R. B., Basu, S., & Bundick, B. (2014). Uncertainty Shocks in a model of effective demand. *Journal of Applied economics* 14(9), 328-429.

Svensson, L. E. (2011). "*Inflation targeting*" In Handbook of Monetary Economics, Volume 3B, edited by BM Friedman and M. Woodford, 1237-1302. Amsterdam:: Elsevier Science.

Swofford, J. L., & Whitney, G. A. (1991). The composition and construction of monetary aggregates. *Economic Inquiry*, *29*(4), 752-761.

Swift, A. L., & Janacek, G. J. (1991). Forecasting non- normal time series. *Journal of Forecasting*, *10*(5), 501-520.

Tang, C. F., & Chua, S. Y. (2012). The savings-growth nexus for the Malaysian economy: A view through rolling sub-samples. *Applied Economics*, *44*(32), 4173-4185.

Taylor, J. B. (1993, December). Discretion versus policy rules in practice. In *Carnegie-Rochester conference series on public policy*, 39, 195-214, North- Holland.

Taylor, J. B. (2009). The financial crisis and the policy responses: An empirical analysis of what went wrong. *National Bureau of Economic Research, working paper* 14631.

Thoma, M. A. (1994). Subsample instability and asymmetries in money-income causality. *Journal of Econometrics*, *64*(1), 279-306.

Thoma, M. A., & Gray, J. A. (1998). Financial market variables do not predict real activity. *Economic Inquiry*, *36*(4), 522-539.

Thornton, D. L., & Batten, D. S. (1985). Lag-length selection and tests of Granger causality between money and income. *Journal of Money, credit and Banking*, *17*(2), 164-178.

Thornton, J. (2008). Money, output and inflation in African economies. *South African Journal of Economics*, *76*(3), 356-366.

Thornton, D. L. (2014). Monetary policy: Why money matters (and interest rates don't). *Journal of Macroeconomics, 40, 202-213.*

Thornton, D. L., & Yue, P. (1992). An extended series of Divisia monetary aggregates. *Federal Reserve Bank of St. Louis Review*, *74*(6), 35-52.

Teles, P., & Zhou, R. (2005). A stable money demand: Looking for the right monetary aggregate. *J. Payment Systems, 1*, 281-304.

Tlelima, T., & Turner, P. (2004). The demand for money in South Africa. *South African Journal of Economics*, *72*(1), 25-36.

Tobin, J. (1958). Liquidity preference as behaviour towards risk. *The review of economic studies*, *25*(2), 65-86.

Tobin, J. (1969). A general equilibrium approach to monetary theory. *Journal of money, credit and banking*, *1(1), 15-29.*

Toda, H. Y., & Yamamoto, T. (1995). Statistical inference in vector auto regressions with possibly integrated processes. *Journal of econometrics*, *66*(1), 225-250.

Toda, H. Y., & Phillips, P. C. (1994). Vector autoregression and causality: A theoretical overview and simulation study. *Econometric reviews*, *13*(2), 259-285.

Valle e Azevedo, J., & Pereira, A. (2010). Forecasting Inflation (and the Business Cycle?) with Monetary Aggregates. *Banco de Portugal, Economics and Research Department working paper*, 6.

Walsh, C. E. (2003). Accountability, transparency, and inflation targeting. *Journal of Money, Credit, and Banking*, *35*(5), 829-849.

Walsh, C. E. (2010). *Monetary theory and policy*. MIT press.

Walsh, C. E. (2017). *Monetary theory and policy*. MIT press.

Wesso, G. R. (2002). *Broad money demand and financial liberalisation in South Africa*. South African Reserve Bank.

Williams, D., Goodhart, C. A., & Gowland, D. H. (1976). Money, income, and causality: The UK experience. *The American Economic Review*, *66*(3), 417-423.

Wolde-Rufael, Y. (2005). Energy demand and economic growth: The African experience. *Journal of Policy Modeling*, *27*(8), 891-903.

Woodford, M. (2003). *Interest and prices*. Princeton University Press. USA.

Woodford, M. (2008). How important is money in the conduct of monetary policy?. *Journal of Money, credit and Banking*, *40*(8), 1561-1598.

World Bank (2016). *World development indicators*: http://databank.worldbank.org/data/views/variableSelection/selectvariables.aspx?source=world-development-indicators.

Yue, P., & Fluri, R. (1991). Divisia monetary services indexes for Switzerland: Are they useful for monetary targeting?. *Federal Reserve Bank of St. Louis Review*, 19-33.

Zapata, H. O., & Rambaldi, A. N. (1997). Monte Carlo evidence on cointegration and causation. *Oxford Bulletin of Economics and statistics*, *59*(2), 285-298.

APPENDIX

APPENDIX A

Monetary Aggregates for Kenya 2000Q1-2015Q3

End of period	SM1	DM1	SM2	DM2	SM3	DM3
2000Q1	100.00	100.00	100.00	100.00	100.00	100.00
2000Q2	102.90	82.96	105.82	84.85	119.65	89.65
2000Q3	103.72	84.38	107.70	86.19	123.44	104.23
2000Q4	105.45	88.35	112.10	103.36	128.47	105.23
2001Q1	108.27	86.24	110.82	109.23	134.68	112.32
2001Q2	109.98	93.65	112.64	110.00	141.68	119.54
2001Q3	108.72	91.49	115.31	113.25	154.08	128.36
2001Q4	115.90	101.87	122.98	120.33	159.36	136.23
2002Q1	115.55	99.85	123.20	121.02	167.33	141.00
2002Q2	122.15	112.01	129.90	126.69	186.23	149.30
2002Q3	123.47	110.12	127.86	126.37	187.23	155.77
2002Q4	131.79	125.79	139.68	134.56	189.66	159.20
2003Q1	134.08	130.80	142.68	138.98	202.47	168.69
2003Q2	138.08	139.23	151.39	143.21	212.69	172.33
2003Q3	159.09	142.33	164.98	159.36	218.99	179.68
2003Q4	172.38	152.00	182.11	168.36	222.36	182.69
2004Q1	173.95	159.32	189.34	172.31	241.88	189.33
2004Q2	175.99	164.58	190.56	187.63	243.68	194.00
2004Q3	182.59	169.33	198.87	188.65	271.64	208.36
2004Q4	189.99	178.69	201.32	199.98	288.03	236.01
2005Q1	186.76	184.33	208.64	203.00	291.27	240.00
2005Q2	193.66	189.23	215.34	212.47	302.31	268.44
2005Q3	201.94	190.00	218.66	214.42	312.22	271.88
2005Q4	208.77	201.11	224.47	220.02	324.51	279.32
2006Q1	217.27	204.12	227.11	223.45	341.28	288.32
2006Q2	235.76	214.21	241.33	236.23	349.88	294.14
2006Q3	240.94	231.32	258.97	247.74	374.66	302.11
2006Q4	259.35	240.00	274.61	260.21	384.12	312.64
2007Q1	264.80	249.65	287.32	279.97	389.64	327.68
2007Q2	290.98	256.33	310.51	281.44	401.11	398.22
2007Q3	314.70	279.11	324.01	312.36	428.72	402.00
2007Q4	327.57	284.12	338.85	324.23	458.11	426.33
2008Q1	343.43	299.71	350.33	341.00	464.69	439.77
2008Q2	369.58	317.12	384.22	364.88	471.98	443.23
2008Q3	347.53	319.45	389.12	379.88	497.11	452.33
2008Q4	357.82	325.65	394.81	388.20	502.14	477.32
2009Q1	358.69	347.87	399.21	391.23	525.57	491.64
2009Q2	355.29	349.87	406.12	403.10	597.22	518.62
2009Q3	390.97	356.65	417.50	405.65	621.74	523.70
2009Q4	401.93	379.18	428.77	419.11	654.77	538.64

Appendix A (Continued)

End of period	SM1	DM1	SM2	DM2	SM3	DM3
2010Q1	418.76	392.57	453.27	430.01	698.88	567.00
2010Q2	446.86	412.33	489.65	444.52	715.63	604.08
2010Q3	475.41	431.21	492.98	488.98	754.12	625.99
2010Q4	511.43	456.33	538.26	526.36	768.22	663.21
2011Q1	533.20	459.36	549.97	531.21	789.10	689.90
2011Q2	549.11	477.27	560.88	542.21	807.17	709.22
2011Q3	565.46	495.65	589.12	566.65	892.33	736.50
2011Q4	579.06	521.21	591.66	574.58	907.56	764.23
2012Q1	555.11	528.65	602.45	589.63	987.12	804.04
2012Q2	564.27	534.33	612.47	603.33	1,145.22	856.23
2012Q3	589.44	566.69	625.44	605.21	1,154.23	890.07
2012Q4	634.70	575.54	649.33	632.11	1,162.98	901.67
2013Q1	646.41	592.70	678.97	649.74	1,174.65	918.44
2013Q2	682.02	612.00	702.08	677.12	1,278.33	1,004.23
2013Q3	700.03	652.78	711.22	698.32	1,304.98	1,112.38
2013Q4	744.96	689.98	769.14	744.00	1,385.44	1,189.22
2014Q1	777.04	711.20	786.47	768.32	1,392.44	1,203.55
2014Q2	814.18	726.36	829.32	799.68	1,451.33	1,236.09
2014Q3	821.84	800.25	859.78	802.07	1,463.23	1,254.87
2014Q4	843.47	826.36	870.22	855.63	1,601.33	1,309.65
2014Q1	863.03	849.65	895.37	877.26	1,709.92	1,384.23
2015Q2	903.66	878.98	934.22	883.23	1,882.32	1,444.23
2015Q3	909.65	894.23	965.47	942.32	1,887.24	1,498.00

Note: SM1, SM2 and SM3 are the simple sum monetary aggregates, DM1, DM2 and DM3 are the Divisia monetary aggregates

APPENDIX B

Monetary Aggregates for Malawi 2000Q1-2015Q3

End of Period	SM1	DM1	SM2	DM2
2000Q1	100.00	100.00	100.00	100.00
2000Q2	105.04	89.64	107.21	99.63
2000Q3	125.47	109.17	134.26	113.53
2000Q4	138.56	118.17	145.25	126.36
2001Q1	130.58	122.32	164.36	132.78
2001Q2	161.38	120.82	189.56	138.45
2001Q3	177.35	141.03	208.36	153.26
2001Q4	186.00	165.22	256.32	169.54
2002Q1	211.23	182.54	289.77	204.36
2002Q2	228.36	198.23	322.25	245.08
2002Q3	244.98	221.64	366.81	271.58
2002Q4	268.97	234.47	389.23	289.11
2003Q1	272.45	249.84	400.36	312.47
2003Q2	284.00	266.85	423.66	356.27
2003Q3	324.21	294.01	435.26	364.25
2003Q4	336.89	319.66	469.78	380.54
2004Q1	356.47	325.20	497.00	419.65
2004Q2	402.36	355.54	544.47	435.61
2004Q3	432.01	386.23	548.97	454.26
2004Q4	448.33	409.89	588.82	475.23
2005Q1	467.23	423.25	608.51	506.55
2005Q2	478.26	455.63	623.32	536.27
2005Q3	490.12	461.00	677.41	579.36
2005Q4	533.21	492.11	711.00	597.87
2006Q1	560.44	508.04	719.55	622.35
2006Q2	569.98	524.32	732.23	638.96
2006Q3	582.44	536.98	802.36	652.36
2006Q4	608.55	587.24	818.22	711.23
2007Q1	666.36	603.25	864.55	723.54
2007Q2	689.00	613.25	898.27	764.48
2007Q3	746.36	635.24	906.33	783.25
2007Q4	799.68	655.63	913.61	800.25
2008Q1	836.65	693.23	940.35	816.35
2008Q2	903.26	704.21	1102.23	839.25
2008Q3	1124.33	735.89	1252.01	856.69
2008Q4	1137.80	801.11	1398.26	896.74
2009Q1	1143.23	827.54	1402.23	908.36
2009Q2	1194.65	855.24	1428.33	945.74
2009Q3	1280.32	904.44	1508.33	977.26
2009Q4	1318.98	944.36	1524.74	1103.00

Appendix B (Continued)

End of Period	SM1	DM1	SM2	DM2
2010Q1	1539.25	989.00	1683.23	1465.69
2010Q2	1695.52	1125.63	1804.55	1523.68
2010Q3	1784.56	1194.52	1811.20	1569.36
2010Q4	1822.00	1211.01	1941.59	1602.36
2011Q1	1883.56	1356.21	2004.95	1700.20
2011Q2	2010.11	1498.23	2217.84	1812.00
2011Q3	2064.75	1849.22	2438.13	1994.36
2011Q4	2154.00	2084.10	2682.29	2163.54
2012Q1	2266.00	2198.66	2664.58	2205.78
2012Q2	2300.54	2345.96	2943.79	2368.44
2012Q3	2369.23	2399.51	3027.01	2401.00
2012Q4	2541.22	2431.20	3250.22	2688.57
2013Q1	2631.00	2553.26	3342.08	2874.58
2013Q2	2981.11	2569.23	3773.45	2988.00
2013Q3	3089.63	2641.02	4160.10	3012.45
2013Q4	3125.00	2811.00	4348.98	3256.32
2014Q1	3369.25	3024.26	4384.14	3398.68
2014Q2	3377.38	3124.55	4746.18	3475.81
2014Q3	4498.02	3259.88	4796.85	3566.36
2014Q4	4112.23	3569.36	5080.60	3845.21
2014Q1	4229.68	3587.42	5108.73	3978.65
2015Q2	4268.98	4032.01	5391.32	4076.00
2015Q3	4310.66	4326.95	6238.59	4118.36

Note: SM1, SM2 are the simple sum monetary aggregates, DM1 and DM2 are the Divisia monetary aggregates

APPENDIX C

Monetary Aggregates for Nigeria 2000Q1-2015Q3

End of Period	SM1	DM1	SM2	DM2
2000Q1	100.00	100.00	100.00	100.00
2000Q2	112.26	99.68	116.00	109.35
2000Q3	124.86	109.45	131.72	117.36
2000Q4	138.30	118.36	146.32	128.69
2001Q1	166.52	146.37	189.24	167.88
2001Q2	181.39	153.23	216.33	178.69
2001Q3	174.81	158.07	224.10	197.36
2001Q4	185.39	167.98	238.00	209.47
2002Q1	190.74	172.36	239.65	226.36
2002Q2	200.43	189.65	254.02	239.00
2002Q3	209.53	190.03	287.49	259.64
2002Q4	223.86	204.31	294.68	276.30
2003Q1	252.91	222.69	304.26	279.63
2003Q2	275.61	246.68	322.00	308.66
2003Q3	278.63	254.36	339.57	317.20
2003Q4	297.94	271.02	356.65	232.36
2004Q1	326.69	306.58	372.01	348.69
2004Q2	339.97	324.69	389.00	364.58
2004Q3	365.87	349.27	394.67	372.26
2004Q4	379.68	361.23	408.37	379.09
2005Q1	403.26	378.25	436.69	408.36
2005Q2	426.68	403.32	456.03	442.36
2005Q3	438.57	418.67	477.27	451.02
2005Q4	469.75	428.69	493.61	467.00
2006Q1	498.23	465.36	511.21	477.07
2006Q2	526.96	496.36	531.26	509.47
2006Q3	530.68	516.28	563.24	518.66
2006Q4	566.74	541.33	614.55	539.58
2007Q1	601.01	574.32	658.23	557.36
2007Q2	626.10	609.32	695.88	577.03
2007Q3	673.89	654.22	754.72	606.57
2007Q4	701.03	674.00	797.33	626.69
2008Q1	721.02	698.76	824.36	652.33
2008Q2	732.01	704.36	869.34	687.24
2008Q3	842.26	737.65	945.36	711.26
2008Q4	869.87	811.23	1194.99	796.66
2009Q1	902.21	836.24	1263.60	804.57
2009Q2	938.69	889.37	1236.78	897.25
2009Q3	1023.33	924.33	1284.06	918.63
2009Q4	1107.57	997.87	1432.40	1103.42

Apppendix C (Continued)

End of Period	SM1	DM1	SM2	DM2
2010Q1	1121.00	1008.69	1488.93	1187.36
2010Q2	1165.47	1123.04	1503.47	1202.47
2010Q3	1216.60	1165.49	1554.68	1268.68
2010Q4	1258.73	1206.97	1564.18	1321.22
2011Q1	1274.48	1254.22	1606.55	1389.67
2011Q2	1307.49	1278.49	1664.07	1407.33
2011Q3	1380.38	1297.84	1731.37	1489.77
2011Q4	1427.16	1311.25	1739.26	1508.69
2012Q1	1538.22	1369.54	1854.34	1566.58
2012Q2	1540.73	1433.00	1864.08	1602.28
2012Q3	1599.78	1489.67	1902.70	1647.57
2012Q4	1621.72	1504.47	2074.29	1700.55
2013Q1	1628.56	1566.37	2147.18	1769.89
2013Q2	1723.36	1602.57	2153.01	1812.21
2013Q3	1765.02	1639.58	2326.36	1922.01
2013Q4	1821.56	1729.58	2596.67	2114.23
2014Q1	1899.97	1768.96	2789.64	2368.58
2014Q2	1956.27	1845.67	2968.46	2410.30
2014Q3	2214.18	1908.65	3260.23	2811.31
2014Q4	2567.24	2106.98	3594.66	2947.87
2014Q1	2711.63	2398.23	3846.97	3223.26
2015Q2	3150.66	2943.21	3948.86	3367.23
2015Q3	3684.07	3328.90	4237.69	3896.37

Note: SM1, SM2 are the simple sum monetary aggregates, DM1 and DM2 are the Divisia monetary aggregates

APPENDIX D

Monetary Aggregates for South Africa 2000Q1-2015Q3

End of period	SM0	DM0	SM1A	DM1A	SM1	DM1	SM2	DM2	SM3	DM3
2000Q1	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
2000Q2	102.53	98.36	116.08	105.32	119.63	109.24	121.37	118.36	136.23	128.67
2000Q3	103.80	99.07	119.45	116.74	121.03	120.14	126.23	124.23	139.68	131.23
2000Q4	114.60	106.23	127.66	119.68	132.02	126.34	134.26	131.26	146.28	139.97
2001Q1	120.09	112.17	136.25	123.44	139.26	131.26	146.31	139.66	153.23	145.36
2001Q2	122.38	120.83	139.65	128.32	148.27	139.87	158.96	147.37	169.32	158.97
2001Q3	134.76	122.20	146.32	134.22	153.20	144.21	164.25	153.08	174.23	165.67
2001Q4	139.67	136.23	149.25	139.68	158.69	149.68	169.44	159.21	189.23	178.68
2002Q1	146.00	140.11	153.23	144.27	167.26	153.04	174.38	168.77	192.20	181.55
2002Q2	149.67	147.95	159.67	150.23	171.23	159.68	182.03	173.22	206.31	196.57
2002Q3	154.36	151.02	161.30	158.34	182.22	168.33	197.82	189.27	211.07	201.58
2002Q4	158.77	154.00	168.45	160.00	190.07	173.66	203.36	198.14	219.90	209.36
2003Q1	162.03	158.98	173.22	167.34	193.02	179.89	219.68	200.13	234.56	216.28
2003Q2	169.22	165.66	178.27	169.87	203.24	188.70	227.21	209.12	248.69	229.32
2003Q3	174.53	168.67	184.90	171.02	208.31	190.57	242.00	218.43	271.01	243.22
2003Q4	181.07	176.31	189.23	179.79	213.34	199.37	249.61	**234.67**	283.23	256.87
2004Q1	189.36	179.04	196.00	187.64	229.20	208.46	253.23	241.07	289.10	267.44
2004Q2	193.37	184.46	218.11	189.87	238.37	211.54	261.03	253.44	309.20	298.68
2004Q3	203.12	189.38	231.54	209.36	249.11	219.97	269.45	258.97	316.37	308.31
2004Q4	219.55	206.43	239.36	224.21	261.18	234.63	272.19	266.59	328.21	311.23
2005Q1	231.67	218.21	246.36	226.34	274.00	241.27	294.28	270.37	336.61	319.87
2005Q2	238.36	229.32	258.30	238.97	283.46	257.58	308.15	286.37	348.28	328.16
2005Q3	254.33	237.48	265.51	251.33	294.56	266.69	319.67	297.83	366.04	341.02
2005Q4	277.59	243.22	287.13	263.21	306.27	278.69	344.61	322.94	374.92	348.31
2006Q1	298.36	262.30	306.23	289.33	327.08	294.50	358.64	340.06	389.30	362.57
2006Q2	308.23	279.05	329.47	307.19	339.61	316.24	374.87	357.61	396.27	377.54
2006Q3	316.25	299.61	342.51	311.69	365.46	339.61	392.06	366.23	411.03	389.53
2006Q4	325.11	316.24	358.27	342.36	381.05	344.28	406.09	378.97	432.03	394.51
2007Q1	329.63	319.21	371.01	358.98	401.08	368.92	413.22	391.04	456.01	409.31
2007Q2	347.29	326.88	382.20	369.59	416.23	395.27	432.26	409.78	473.63	425.37
2007Q3	368.67	352.48	394.11	372.02	433.21	408.31	463.11	435.64	498.01	436.66
2007Q4	384.33	363.52	403.26	388.64	448.67	423.07	478.03	459.37	507.03	463.57
2008Q1	408.29	377.65	428.61	397.48	473.23	436.98	501.31	487.21	531.03	498.64
2008Q2	439.66	422.27	452.17	433.32	492.11	468.65	519.68	492.05	546.08	511.03
2008Q3	454.21	439.31	484.70	456.37	508.37	499.27	536.22	521.22	577.00	538.72
2008Q4	476.32	455.19	492.08	482.32	521.43	504.61	548.28	533.00	592.03	558.57
2009Q1	481.02	468.37	510.04	497.36	533.21	521.06	566.00	543.23	628.01	586.97
2009Q2	489.37	471.89	519.23	503.79	557.31	538.21	589.07	562.22	656.03	590.01
2009Q3	496.32	481.02	536.67	522.13	582.67	567.61	596.77	572.22	668.09	608.93
2009Q4	508.06	490.33	549.31	537.54	590.17	583.07	609.21	587.94	683.04	623.52

Appendix D (Continued)

End of period	SM0	DM0	SM1A	DM1A	SM1	DM1	SM2	DM2	SM3	DM3
2010Q1	513.67	508.22	565.29	548.64	608.23	593.05	623.01	608.33	723.04	657.64
2010Q2	534.66	517.24	582.34	568.00	633.23	608.33	648.07	619.57	744.03	684.05
2010Q3	558.31	531.04	597.28	577.81	648.23	619.76	659.33	633.51	749.27	697.03
2010Q4	572.33	557.46	609.37	580.64	667.83	634.58	672.12	649.88	763.02	708.11
2011Q1	579.84	562.77	632.10	593.24	698.20	649.31	679.22	655.53	788.09	712.35
2011Q2	588.07	569.33	659.33	608.65	704.60	663.44	704.23	679.28	796.00	725.68
2011Q3	601.39	576.39	674.43	618.54	716.08	687.64	732.00	693.76	824.01	746.38
2011Q4	623.54	598.63	692.31	632.56	728.36	697.08	766.42	728.62	833.04	759.67
2012Q1	638.45	613.20	703.01	641.11	754.01	711.24	789.27	745.22	852.97	781.04
2012Q2	652.30	634.52	724.23	659.63	769.08	738.55	803.66	779.38	869.33	789.62
2012Q3	679.13	663.24	744.31	718.77	793.02	751.04	816.20	798.27	878.64	803.65
2012Q4	688.27	671.01	762.37	726.38	806.31	776.38	835.43	813.24	902.00	832.04
2013Q1	692.01	679.68	789.36	724.31	813.03	792.01	848.97	826.67	923.43	855.26
2013Q2	701.23	692.17	799.21	754.26	819.23	803.24	865.43	833.56	944.31	867.34
2013Q3	716.28	705.65	807.24	784.66	834.65	816.37	884.01	849.00	973.23	881.76
2013Q4	724.36	719.86	833.60	809.33	889.76	833.29	908.87	880.69	1009.55	898.98
2014Q1	739.64	721.00	859.27	826.54	906.28	848.96	922.01	894.53	1137.44	938.66
2014Q2	744.23	734.26	873.44	839.57	925.66	870.38	934.07	908.21	1165.03	949.01
2014Q3	783.26	758.46	889.37	861.78	938.23	889.67	973.03	918.64	1198.20	992.73
2014Q4	796.23	764.58	897.20	874.02	964.51	916.55	1123.03	968.11	1236.88	1014.64
2014Q1	804.23	782.04	905.36	897.68	986.21	924.33	1203.01	1105.03	1243.22	1034.14
2015Q2	812.22	791.22	924.12	916.35	1002.06	958.36	1239.33	1118.33	1287.49	1104.57
2015Q3	823.54	806.31	933.24	921.37	1016.03	977.68	1298.31	1134.98	1321.00	1167.06

Note: SM0, SM1A, SM1, SM2 and SM3 are the simple sum aggregates, while DM0, DM1A,DM1, DM2 and DM3 are the Divisia aggregates

APPENDIX E

Estimation results of GARCH (1,1) model for Kenya

Parameters		MOU	OUU
Mean Equation	Φ(Constant)	104.049(0.469)***	6.924(7.103)***
Variance Equation	ϾϽ(Constant)	0.398(0.426)*	5.071(7.484)*
	α(ARCH effect)	1.666(0.716)**	0.348(0.138)***
	β(GARCH effect)	0.441(0.119)***	0.548(0.162)***

Note: Numbers in parenthesis are the standard errors. ***,** and * indicate 1%, 5%, and 10% significance level respectively.

APPENDIX F

Estimation results of GARCH (1,1) model for Malawi

Parameters		MOU	OUU
Mean Equation	Φ(Constant)	0.0189(0.001)***	7.510(5.702)***
Variance Equation	ϾϽ(Constant)	1.496(1.305)**	8.223(2.507)*
	α(ARCH effect)	1.531(0.626)**	0.436(0.242)**
	β(GARCH effect)	0.202(0.098)**	0.327(0.279)**

Note: Numbers in parenthesis are the standard errors. ***,** and * indicate 1%, 5%, and 10% significance level respectively.

APPENDIX G

Estimation results of GARCH (1,1) model for Nigeria

Parameters		MOU	OUU
Mean Equation	Φ(Constant)	295.246(0.297)***	30.125(0.016)***
Variance Equation	ϾϽ(Constant)	15.213(5.026)**	0.001(0.006)
	α(ARCH effect)	1.900(1.030)*	1.846(1.777)**
	β(GARCH effect)	0.440(0.049)***	0.778(0.052)***

Note: Numbers in parenthesis are the standard errors. ***,** and * indicate 1%, 5%, and 10% significance level respectively.

APPENDIX H

Estimation results of GARCH (1,1) model for South Africa

Parameters		MOU	OUU
Mean Equation	Φ(Constant)	108.147(2.481)***	27.137(0.118)***
Variance Equation	ϠϽ(Constant)	50.164(57.617)	0.000(0.002)
	α(ARCH effect)	1.656(1.023)**	1.424(1.329)*
	β(GARCH effect)	0.714(0.111)***	0.452(0.142)***

Note: Numbers in parenthesis are the standard errors. ***,** and * indicate 1%, 5%, and 10% significance level respectively.